an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

9. (Amended) A method for operating an emission control system, the emission control system including a particle filter and an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas, the method comprising the step of:

preventing development of ash-forming compounds of sulfur contained in the exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

REMARKS

I. Introduction

Claims 1 to 13 are pending in the present application. In view of the foregoing amendments and the following remarks, it is respectfully submitted that all of the presently pending claims are allowable, and reconsideration is respectfully requested.

Applicants note with appreciation the acknowledgment of the claim for foreign priority and the indication that all copies of the certified copies of the priority documents have been received.

Applicants thank the Examiner for considering the previously filed Information Disclosure Statement, PTO-1449 paper and cited references.

II. Objection to the Specification

The Specification was objected to on the basis of certain informalities. As indicated above, the Specification has been amended herein to include reference numerals after "catalyst" and "muffler". No new matter has been added. It is respectfully submitted that the objection to the Specification has been obviated, and withdrawal of this objection is therefore respectfully requested.

III. Rejection of Claims 1 and 9 Under 35 U.S.C. § 102(e)

Claims 1 and 9 were rejected under 35 U.S.C. 102(e) as anticipated by U.S. Patent No. 6,003,303 to Peter-Hoblyn et al. ("Peter-Hoblyn et al."). The Examiner maintains that Peter-Hoblyn et al. disclose an emission control system, and a method for operating such system, that comprises a particle filter and an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas. Applicants respectfully submit that Peter-Hoblyn et al. do not anticipate the present claims for the following reasons.

Claim 1, as amended, relates to an emission control system. Claim 1 recites that the emission control system includes a particle filter and an arrangement disposed upstream from the particle filter. The arrangement is configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

Claim 9, as amended, relates to a method for operating an emission control system, the emission control system including a particle filter and an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas. The method includes the step of preventing development of ash-forming compounds of sulfur contained in the exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

Peter-Hoblyn et al. purport to relate to a combination of mechanical devices and fuel additives to reduce the emissions of pollutants from diesel engines. In one series of embodiments, diesel emissions of NO_x and particulates are reduced, simultaneously with gaseous hydrocarbons and carbon monoxide, by the combined use of exhaust gas recirculation or engine timing modification with a particulate trap and a platinum group metal catalyst composition. In another embodiment, a multi-metal catalyst composition comprising a combination of a platinum metal catalyst composition and at least one auxillary catalyst metal composition, especially cerium or copper, is employed to provide catalyst metal to the exhaust system including a diesel trap to lower the balance point of the particulate trap (the temperature at

which the rate of loading equals the rate of regeneration) while also lowering the emissions of carbon monoxide and unburned hydrocarbons. Peter-Hoblyn et al. further purport that various embodiments show selective maintenance of low oxidation of SO_2 to SO_3.

To anticipate a claim, each and every element as set forth in the claim must be found in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Furthermore, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). That is, the prior art must describe the elements arranged as required by the claims. In re Bond, 910 F.2d 831, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). Additionally, to reject a claim under 35 U.S.C. § 102, the Examiner must demonstrate that each and every claim limitation is contained in a single prior art reference. See, Scripps Clinic & Research Foundation v. Genentech, Inc., 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Still further, not only must each of the claim limitations be identically disclosed, an anticipatory reference must also enable a person having ordinary skill in the art to practice the claimed invention, namely the inventions of the rejected claims, as discussed above. See, Akzo, N.V. v. U.S.I.T.C., 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986).

It is respectfully submitted that Peter-Hoblyn et al. fail to disclose, or even suggest, an arrangement that is configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, as recited in amended claims 1 and 9. In contrast, Peter-Hoblyn et al. discloses the reduction of hydrocarbons and carbon monoxide through the combined use of exhaust gas recirculation or engine timing modification with a particulate trap and a platinum group metal catalyst composition, or through the use of a multi-metal catalyst composition comprising a combination of a platinum metal catalyst composition and at least one auxillary catalyst metal composition in an exhaust system including a diesel trap.

Therefore, it is respectfully submitted that Peter-Hoblyn et al. do not anticipate claims 1 and 9, and Applicants request that the rejections be withdrawn.

IV. Rejection of Claims 1 to 13 Under 35 U.S.C. § 103(a)

Claims 1 to 13 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application Publication 2001/0035006 to Dou et al. ("Dou et al.") in view of U.S. Patent No. 5,850,735 to Araki et al. ("Araki et al."). The Examiner maintains that, in Figure 17, Dou et al. disclose an emission control system, a method for operating such system, and a method and a device for reducing ash components in a particle filter of an exhaust system for a diesel engine, that comprises a catalyst disposed upstream from the particle filter, wherein the catalyst includes a sulfur-storing catalyst configured as a NOx collector and wherein the catalyst is configured to adsorb sulfur species in a fuel lean and low temperature environment and to desorb the sulfur species in a fuel rich and high temperature environment. The Examiner acknowledges that Dou et al. fail to disclose the mechanism of sulfur adsorption and desorption in the catalyst, and how to minimize the production of sulfur particulate matters which can clog up the filter, but further maintains that Araki et al. teach a method for purifying exhaust gas, that describes the mechanism of absorption and desorption of sulfur species in a SO_x absorbent whereby, in a lean environment, sulfur is absorbed by an absorbent layer of the SO_x absorbent in the form of a SO_4 sulfate and in a fuel rich and high temperature environment, SO_4 is desorbed from the absorbent layer to become either SO_2 (gas state) or SO_3 (solid state). The Examiner further maintains that by selectively raising the exhaust gas to a temperature above a predetermined value and lowering the oxygen content in the exhaust gas to minimize the conversion of SO_4 to SO_3 during the desorption of sulfur, Araki et al. discloses that the amount of particulate matters released into the atmosphere can be maintained at a low lever. The Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the method taught by Araki et al. in the system, methods, and device of Dou et al., since the use thereof would have minimized the generation of sulfur particulate matters which can clog up the particle filter. It is respectfully submitted that neither Dou et al. Nor Araki et al., either separately or in combination, render obvious the present claims for the following reasons.

To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference

teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

In addition to claims 1 and 9 discussed above, claims 12 and 13 are also independent claims. Claim 12 relates to a method for reducing ash components in a particle filter of an exhaust system for a diesel engine. The method includes the steps of maintaining ash-forming exhaust components in a gaseous state in a catalyst disposed upstream from the particle filter. The method also includes the step of storing sulfur in the catalyst. In addition, claim 12 recites the step of passing the ash-forming exhaust components in the gaseous state through the particle filter.

Claim 13 relates to a device for reducing ash components in a particle filter of an exhaust system of a diesel engine. Claims 13 recites that a catalyst is disposed upstream from the particle filter. Claim 13 further recites that the catalyst includes a sulfur-storing catalyst configured as a NO_x collector. In addition, claim 13 recites that the catalyst is further configured to change ash-forming exhaust components to a gaseous state flowable through the particle filter.

Dou et al. purport to relate to an exhaust gas catalyst system that includes a sulfur trap warm-up catalyst, housed within the exhaust stream that includes a sulfur scavenger component and a NO_x adsorber catalyst, housed within the exhaust stream down-stream from the sulfur trap in an underfloor position. Dou et al. further purports to relate to a method of reducing sulfur poisoning of a nitrogen oxide adsorber, housed within an exhaust gas catalyst system, by placing a sulfur cap within the exhaust stream upstream from a NO_x adsorber, wherein the sulfur trap comprises a sulfur scavenger component.

Araki et al. on the other hand purport to relate to a method for purifying exhaust gas of an internal combustion engine by supplying fuel to an exhaust gas passage upstream of a sulfate absorbent in order to raise the temperature of the exhaust gas flowing into the sulfate absorbent. By raising the exhaust gas

temperature above a predetermined peak temperature, the ratio of SO_3 in the SO_x mixture released from the sulfate absorbent is caused to decrease. The temperature is selected in such a manner that, when SO_x is released from the sulfate absorbent, the amount of SO_3, i.e., the amount of particulate matter, released into the atmosphere is relatively low.

It is respectfully submitted that neither Dou et al. nor Araki et al. teach or suggest, either separately or in combination, all of the claim limitations recited in independent claims 1, 9, 12 and 13. For instance, neither Dou et al. nor Araki et al. teach or suggest, either separately or in combination, that the development of ash-forming compounds contained in an exhaust gas is prevented or reduced by transforming and/or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter, as recited in amended claims 1, 9, 12 and 13. In contrast, Araki et al. seek to instead minimize the amount of SO_3 , i.e., particulate matter, released from a sulfate absorbent into the atmosphere. Araki et al. does not teach or suggest how to minimize the clogging of a particle filter by preventing the development of ash-forming compounds that enter the particle filter by transforming and/or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter. Dou et al., on the other hand, seek to prevent sulfur poisoning of an NOX adsorbent by employing a sulfur trap in a NOX adsorber system. Thus, Dou et al. does not teach or suggest how to minimize the clogging of a particle filter by preventing the development of ash-forming compounds that enter the particle filter by transforming and/or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

It is therefore respectfully submitted that neither Dou et al. nor Araki et al., either separately or in combination, render obvious independent claims 1, 9, 12 and 13. Furthermore, it is respectfully submitted that neither Dou et al. nor Araki et al., either separately or in combination, render obvious dependent claims 2-8 and 10-11, which depend from claims 1 and 9, respectively. In re Fine, supra (any dependent claim that depends from a non-obvious independent claim is non-obvious).

V. Conclusion

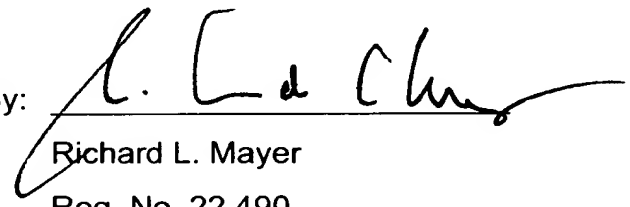
Attached hereto is a marked-up version of the changes made to the Specification and claims by the current Amendment. The attached page is captioned "**Version with Markings to Show Changes Made.**"

It is therefore respectfully submitted that all of the presently pending claims are allowable. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

KENYON & KENYON

Dated: 5/22/02

By: 

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Version with Markings to Show Changes Made

IN THE SPECIFICATION:

The paragraph beginning at page 7, line 4 has been amended as follows:

Proceeding from the exhaust manifold 36, the exhaust from diesel engine 24 passes via the exhaust turbine of exhaust turbocharger 30 to a SO_x collector 42. SO_x collector 42 is combined with a NO_x collector and an oxidation catalyst. Downstream from SO_x collector 42 is a particle filter 44. The particle filter 44 is followed by an underbody catalyst 46 that further reduces pollutant emissions. Downstream from the underbody catalyst 46 is a muffler 48 to reduce noise.

IN THE CLAIMS:

Claims 1 and 9 have been amended without prejudice as follows:

1. (Amended) An emission control system, comprising:

a particle filter; and

an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.

9. (Amended) A method for operating an emission control system, the emission control system including a particle filter and an arrangement disposed upstream from the particle filter, the arrangement being configured to prevent development of ash-forming compounds of sulfur contained in an exhaust gas, the method comprising the step of:

preventing development of ash-forming compounds of sulfur contained in the exhaust gas by transforming or maintaining at least a portion of the ash-forming compounds in a gaseous state flowable through the particle filter.